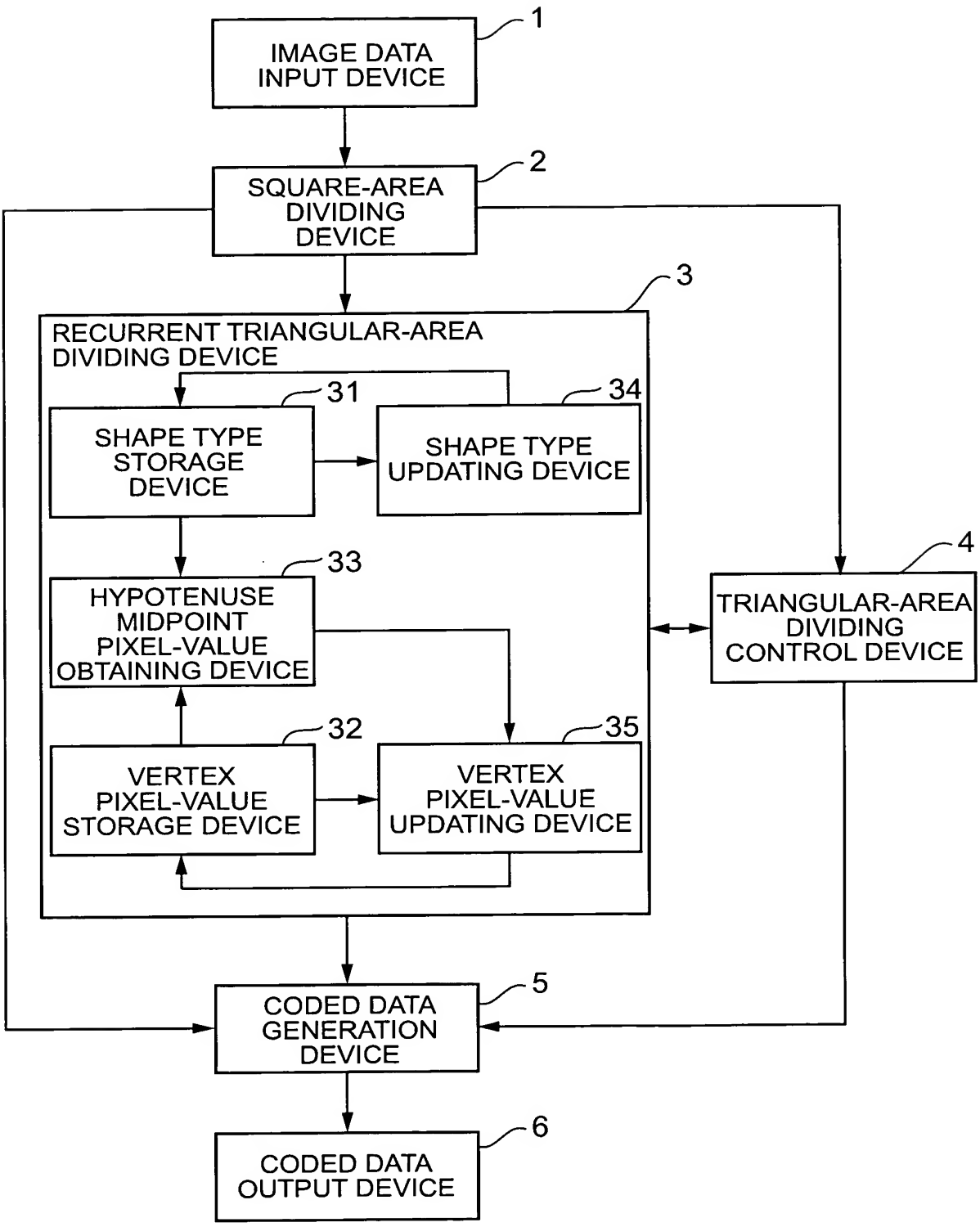

1
IMAGE DATA INPUT DEVICE
2
SQUARE-AREA DIVIDING DEVICE
3
RECURRENT TRIANGULAR-AREA DIVIDING DEVICE
31
SHAPE TYPE STORAGE DEVICE
34
SHAPE TYPE UPDATING DEVICE
33
HYPOTENUSE MIDPOINT PIXEL-VALUE OBTAINING DEVICE
32
VERTEX PIXEL-VALUE STORAGE DEVICE
35
VERTEX PIXEL-VALUE UPDATING DEVICE
4
TRIANGULAR-AREA DIVIDING CONTROL DEVICE
5
CODED DATA GENERATION DEVICE
6
CODED DATA OUTPUT DEVICE

FIG. 1

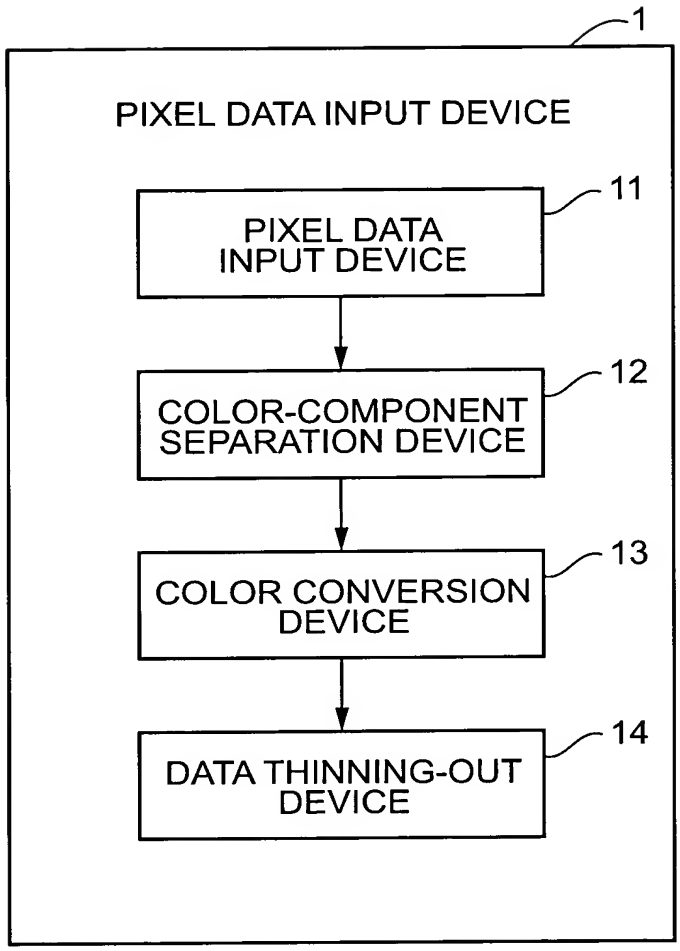

1
PIXEL DATA INPUT DEVICE
11
PIXEL DATA INPUT DEVICE
12
COLOR-COMPONENT SEPARATION DEVICE
13
COLOR CONVERSION DEVICE
14
DATA THINNING-OUT DEVICE

FIG. 2

BEST AVAILABLE COPY

(a)

(b)

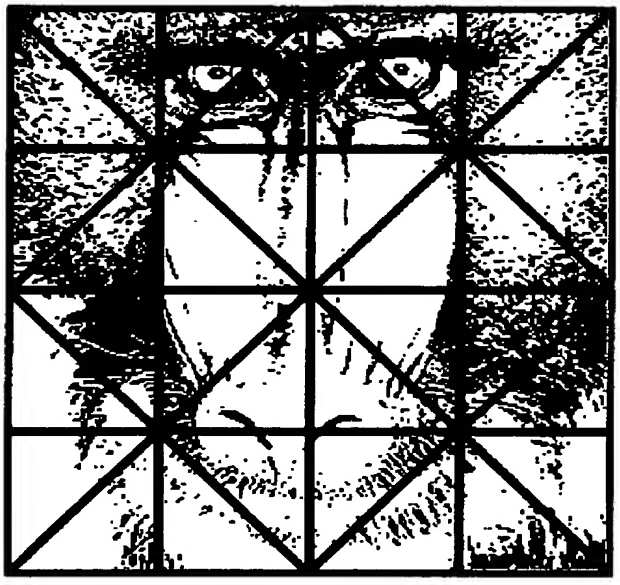


FIG. 3

BEST AVAILABLE COPY

(a)

(b)

FIG. 4

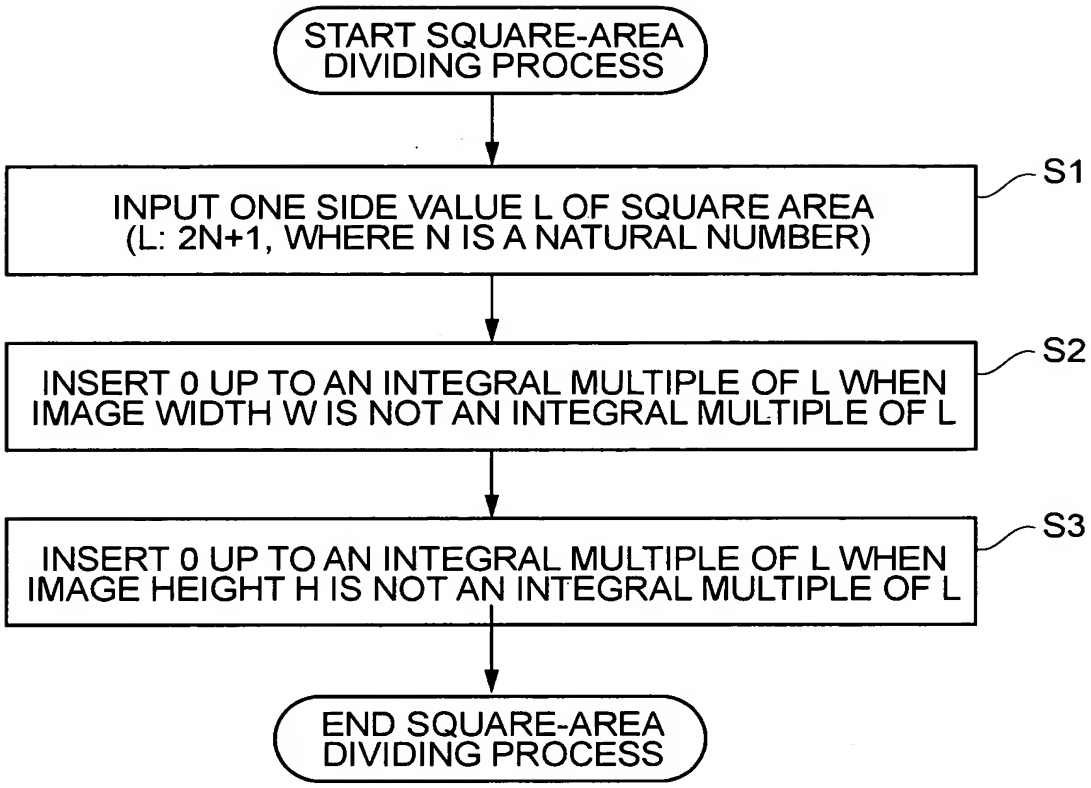

START SQUARE-AREA DIVIDING PROCESS
INPUT ONE SIDE VALUE L OF SQUARE AREA (L: 2N+1, WHERE N IS A NATURAL NUMBER)
S1
INSERT 0 UP TO AN INTEGRAL MULTIPLE OF L WHEN IMAGE WIDTH W IS NOT AN INTEGRAL MULTIPLE OF L
S2
INSERT 0 UP TO AN INTEGRAL MULTIPLE OF L WHEN IMAGE HEIGHT H IS NOT AN INTEGRAL MULTIPLE OF L
S3
END SQUARE-AREA DIVIDING PROCESS

FIG. 5

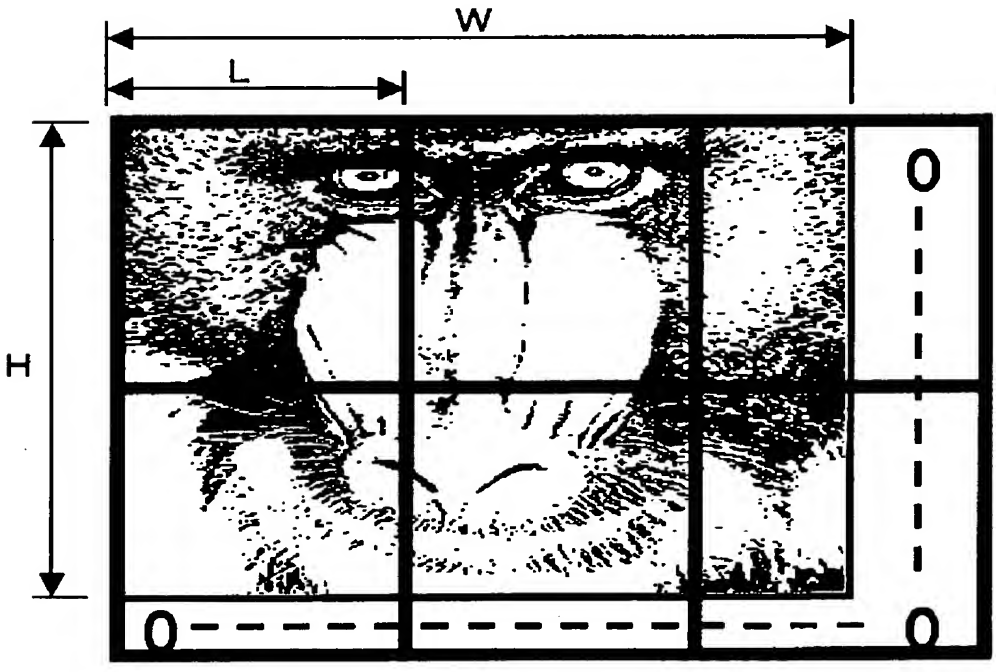
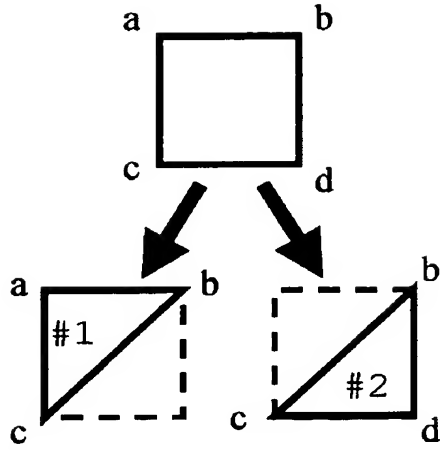

W
L
H
0
0
0

FIG. 6

(a)



(b)

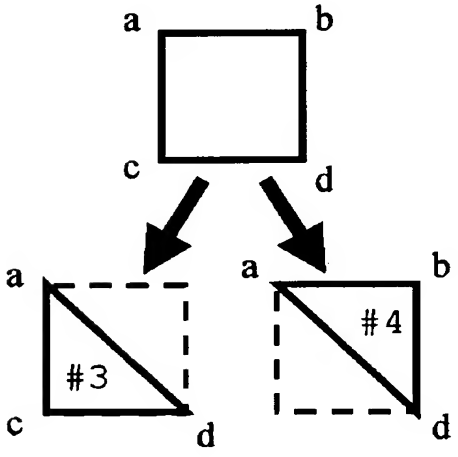


FIG. 7

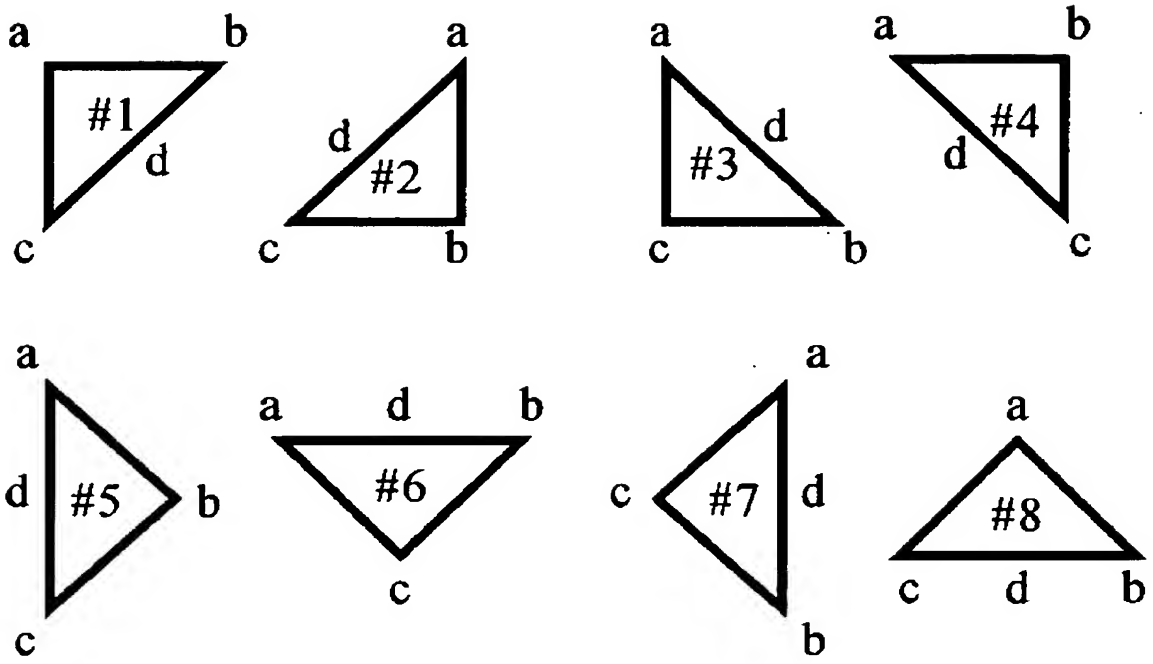

a
b
#1
d
c
a
d
#2
c
b
a
d
#3
c
b
a
b
#4
d
c
a
d
#5
b
c
a
d
b
#6
c
a
c
#7
d
b
a
#8
c
d
b

FIG. 8

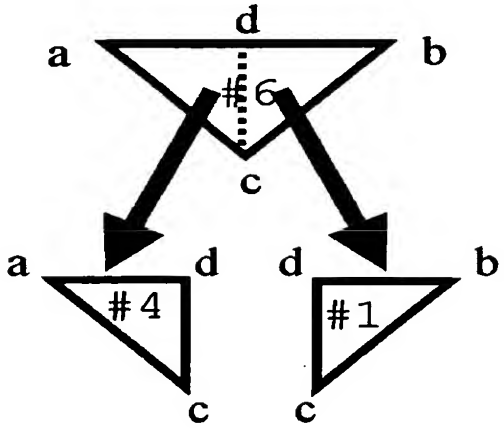

d
a
b
#6
c
a
d
#4
c
d
b
#1
c

FIG. 9

BEFORE DIVISION		AFTER DIVISION 1		AFTER DIVISION 2	
TYPE	PIXEL VALUE	TYPE	PIXEL VALUE	TYPE	PIXEL VALUE
#0	(a,b,c,d)	#1	(a,b,c,-)	#2	(b,c,d,-)
#0	(a,b,c,d)	#3	(a,c,d,-)	#4	(a,b,d,-)

FIG.10

BEFORE DIVISION		AFTER DIVISION 1		AFTER DIVISION 2	
TYPE	PIXEL VALUE	TYPE	PIXEL VALUE	TYPE	PIXEL VALUE
#1	(a,b,c,d)	#5	(a,d,c,-)	#6	(a,b,d,-)
#2	(a,b,c,d)	#7	(a,b,d,-)	#8	(d,b,c,-)
#3	(a,b,c,d)	#5	(a,d,c,-)	#8	(d,b,c,-)
#4	(a,b,c,d)	#6	(a,b,d,-)	#7	(b,c,d,-)
#5	(a,b,c,d)	#1	(d,b,c,-)	#3	(a,b,d,-)
#6	(a,b,c,d)	#1	(d,b,c,-)	#4	(a,d,c,-)
#7	(a,b,c,d)	#2	(a,d,c,-)	#4	(c,d,b,-)
#8	(a,b,c,d)	#2	(a,d,c,-)	#3	(a,b,d,-)

FIG.11

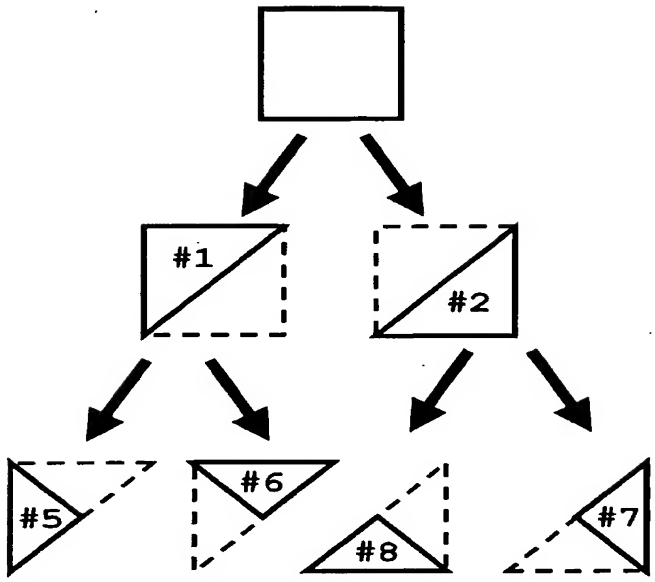

#1
#2
#5
#6
#8
#7

FIG.12

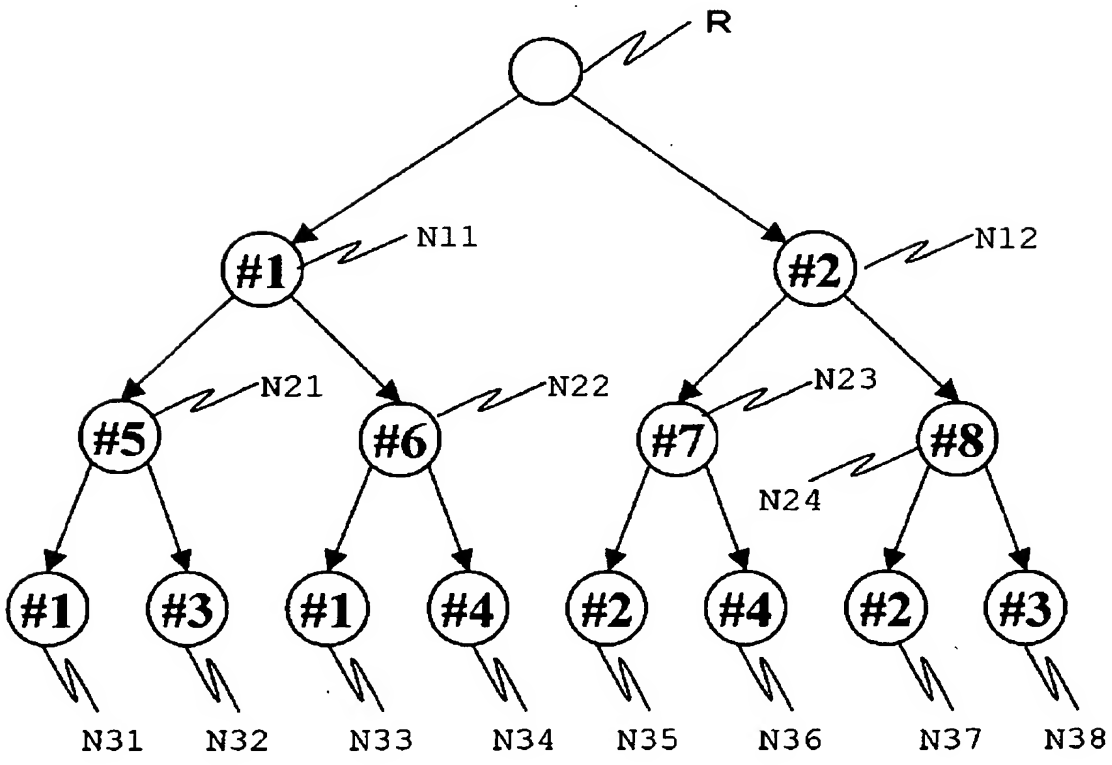

R
#1
N11
#2
N12
N21
N22
N23
#5
#6
#7
#8
N24
#1
#3
#1
#4
#2
#4
#2
#3
N31
N32
N33
N34
N35
N36
N37
N38

FIG.13

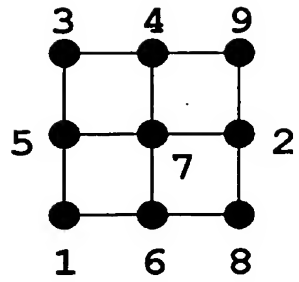


FIG.14

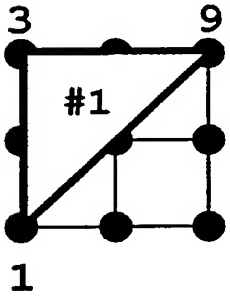


FIG.15A

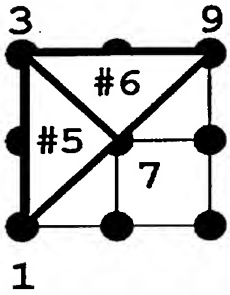


FIG.15B

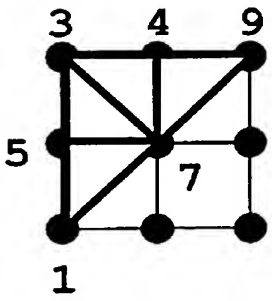


FIG.15C

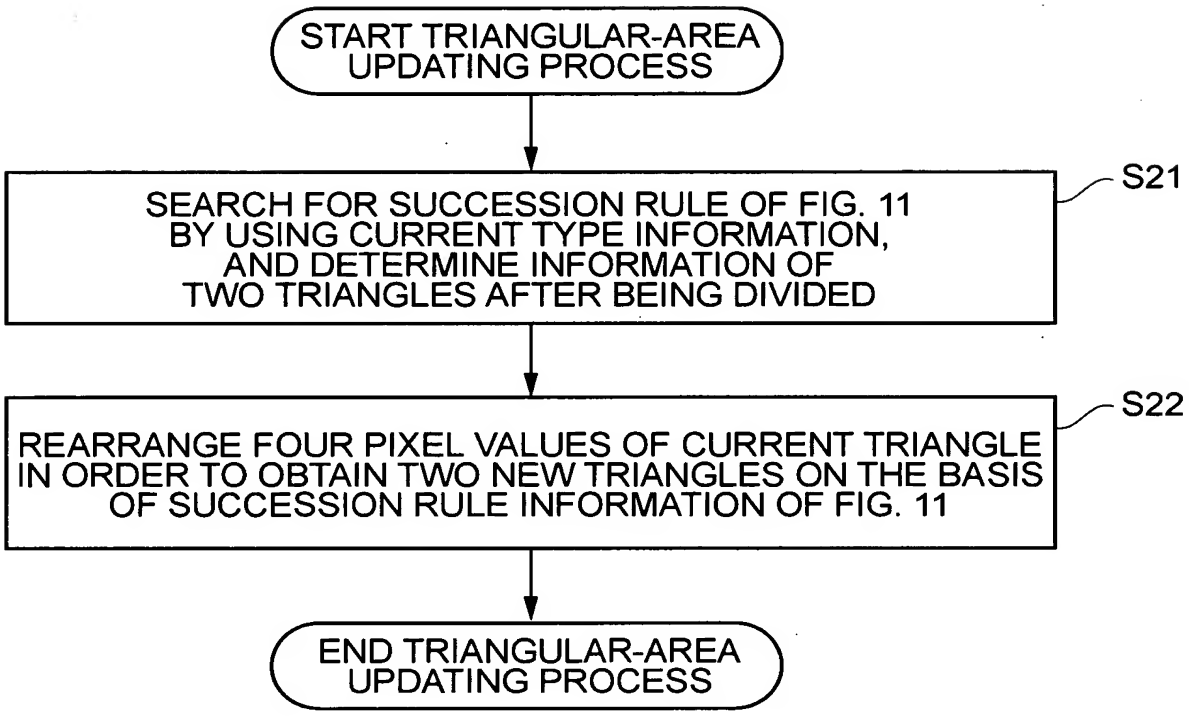

START TRIANGULAR-AREA UPDATING PROCESS
SEARCH FOR SUCCESSION RULE OF FIG. 11 BY USING CURRENT TYPE INFORMATION, AND DETERMINE INFORMATION OF TWO TRIANGLES AFTER BEING DIVIDED
S21
REARRANGE FOUR PIXEL VALUES OF CURRENT TRIANGLE IN ORDER TO OBTAIN TWO NEW TRIANGLES ON THE BASIS OF SUCCESSION RULE INFORMATION OF FIG. 11
S22
END TRIANGULAR-AREA UPDATING PROCESS

FIG.16

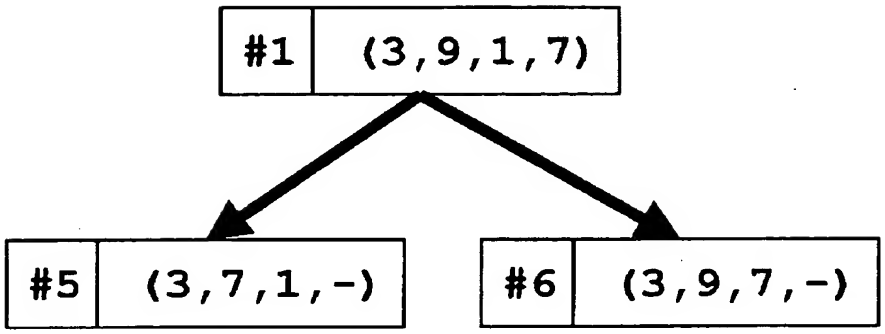

#1
(3,9,1,7)
#5
(3,7,1,-)
#6
(3,9,7,-)

FIG.17

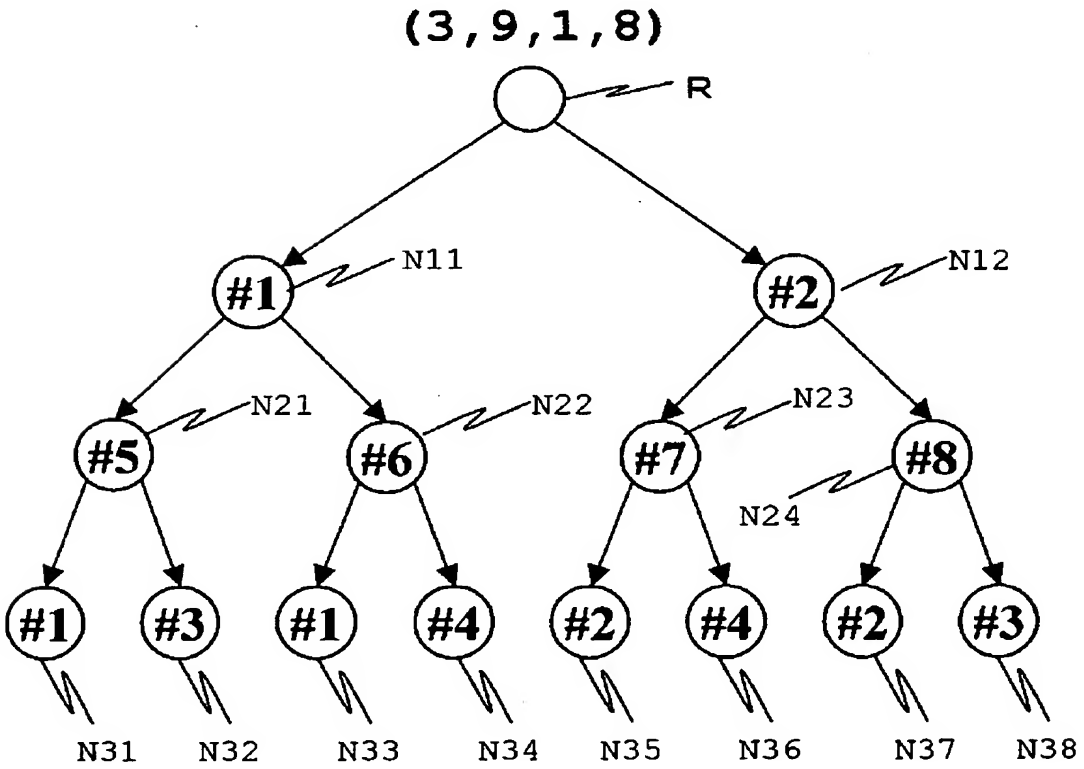

(3,9,1,8)
R
#1
N11
#2
N12
#5
N21
#6
N22
#7
N23
#8
N24
#1
#3
#1
#4
#2
#4
#2
#3
N31
N32
N33
N34
N35
N36
N37
N38

FIG.18

BEST AVAILABLE COPY

FIG.19

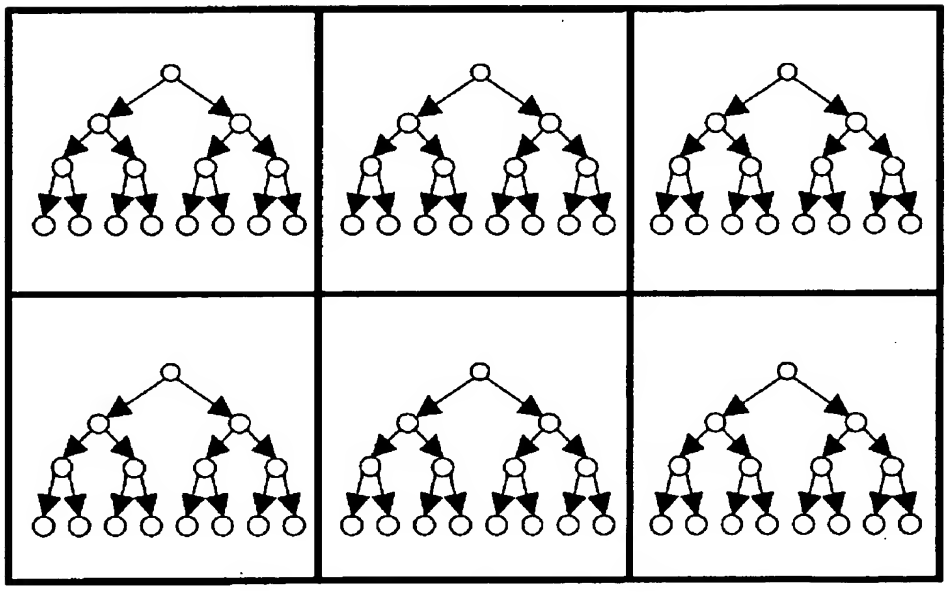


FIG.20

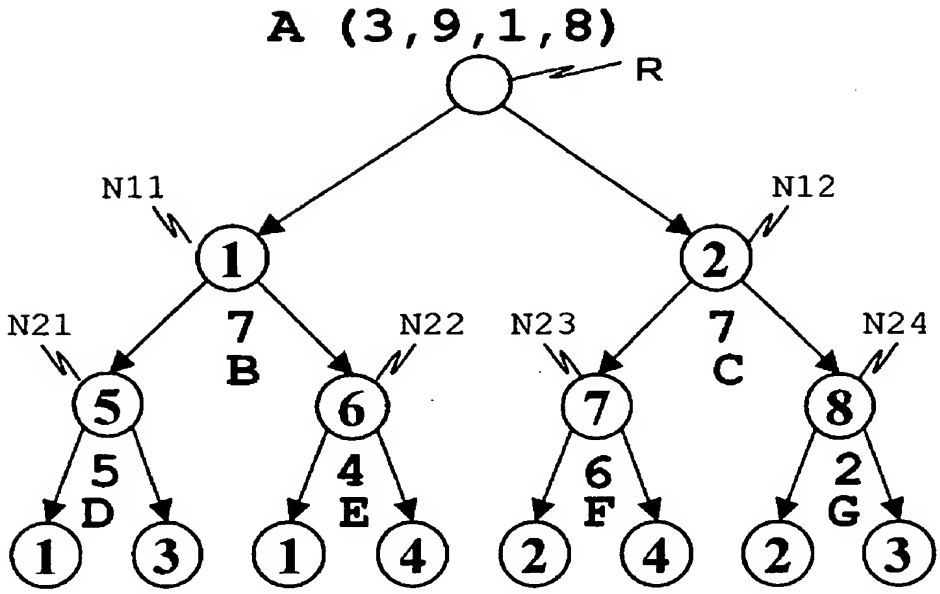


FIG.21

$$\underbrace{3,9,1,8}_{A},\underline{7},\underline{7},\underline{5},\underline{4},\underline{6},\underline{2}$$

B C D E F G

FIG.22

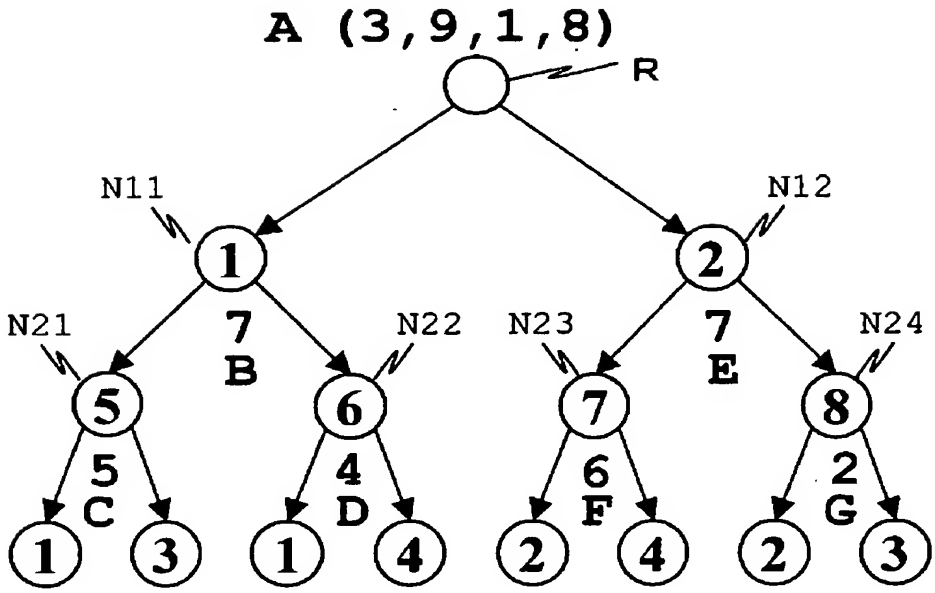


FIG.23

3,9,1,8,7,5,4,7,6,2

A B C D E F G

FIG.24

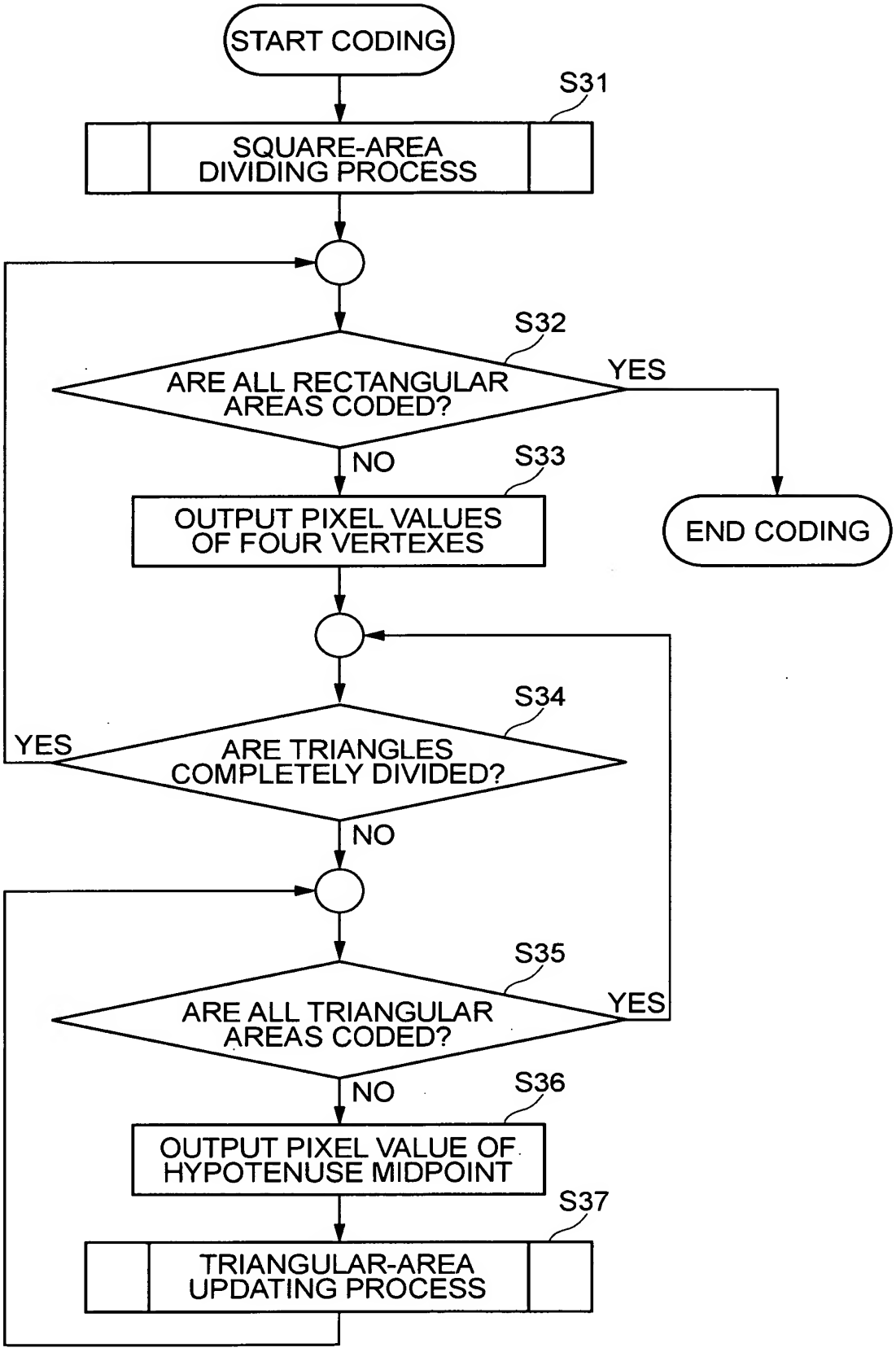

START CODING
S31
SQUARE-AREA DIVIDING PROCESS
S32
ARE ALL RECTANGULAR AREAS CODED?
YES
NO
S33
OUTPUT PIXEL VALUES OF FOUR VERTEXES
END CODING
S34
ARE TRIANGLES COMPLETELY DIVIDED?
YES
NO
S35
ARE ALL TRIANGULAR AREAS CODED?
YES
NO
S36
OUTPUT PIXEL VALUE OF HYPOTENUSE MIDPOINT
S37
TRIANGULAR-AREA UPDATING PROCESS

FIG.25

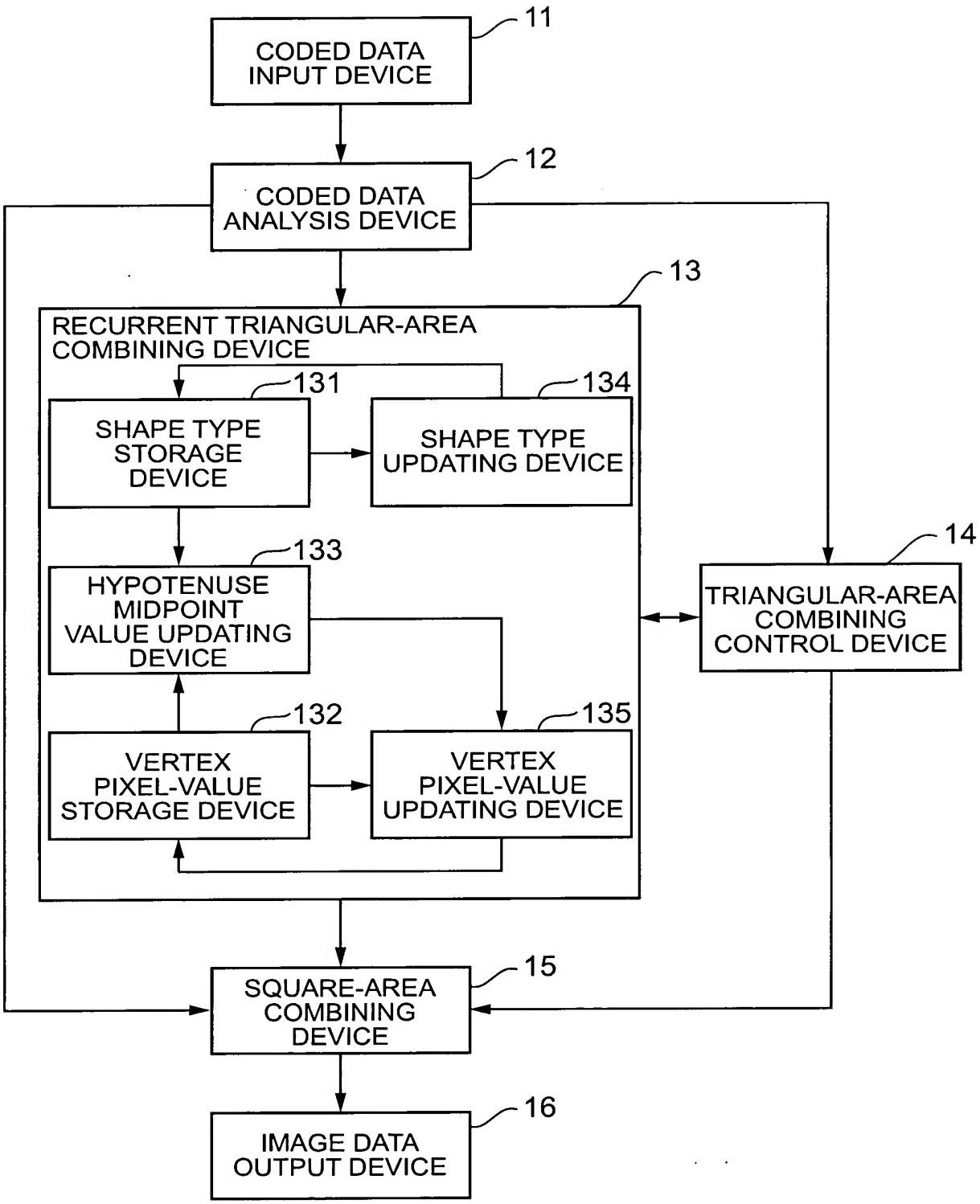

11
CODED DATA INPUT DEVICE
12
CODED DATA ANALYSIS DEVICE
13
RECURRENT TRIANGULAR-AREA COMBINING DEVICE
131
SHAPE TYPE STORAGE DEVICE
134
SHAPE TYPE UPDATING DEVICE
133
HYPOTENUSE MIDPOINT VALUE UPDATING DEVICE
132
VERTEX PIXEL-VALUE STORAGE DEVICE
135
VERTEX PIXEL-VALUE UPDATING DEVICE
14
TRIANGULAR-AREA COMBINING CONTROL DEVICE
15
SQUARE-AREA COMBINING DEVICE
16
IMAGE DATA OUTPUT DEVICE

FIG.26

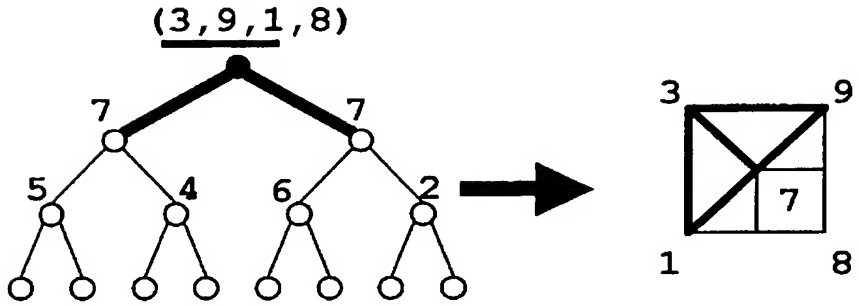


FIG.27A

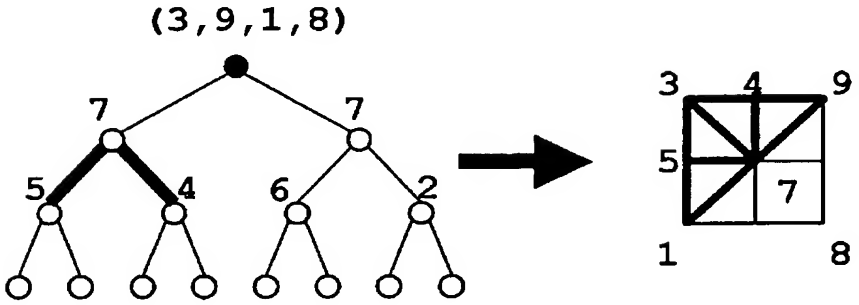


FIG.27B

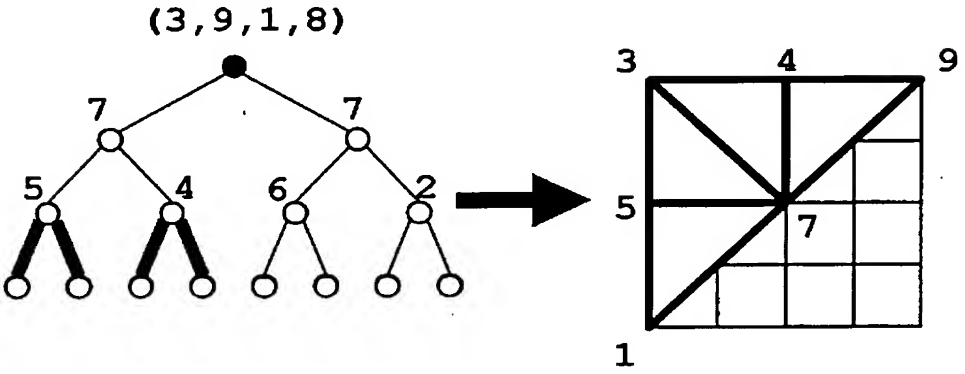


FIG.27C

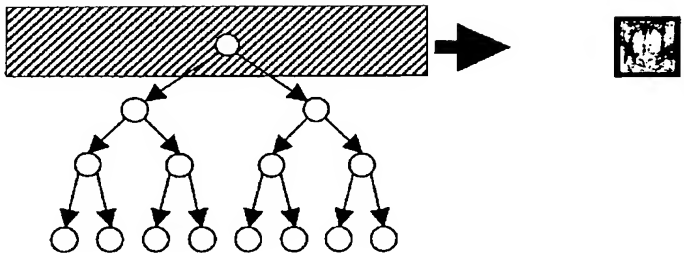


FIG.28A

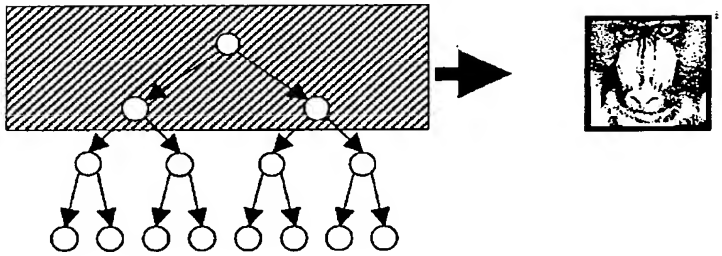


FIG.28B

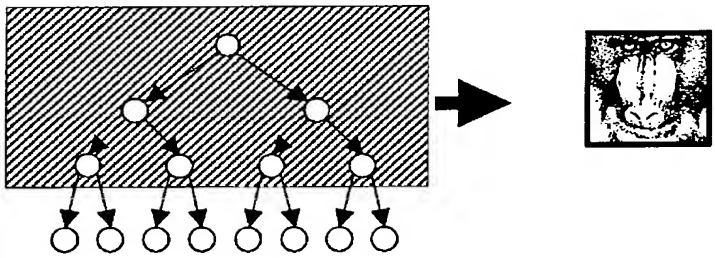


FIG.28C

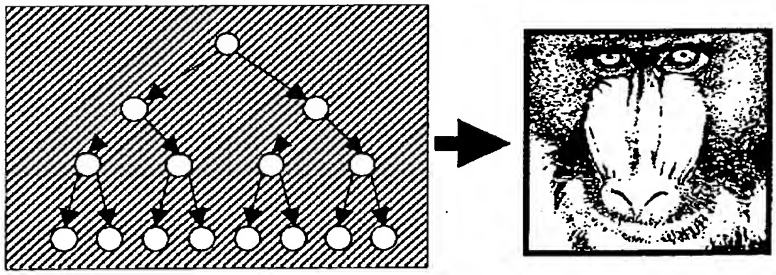


FIG.28D

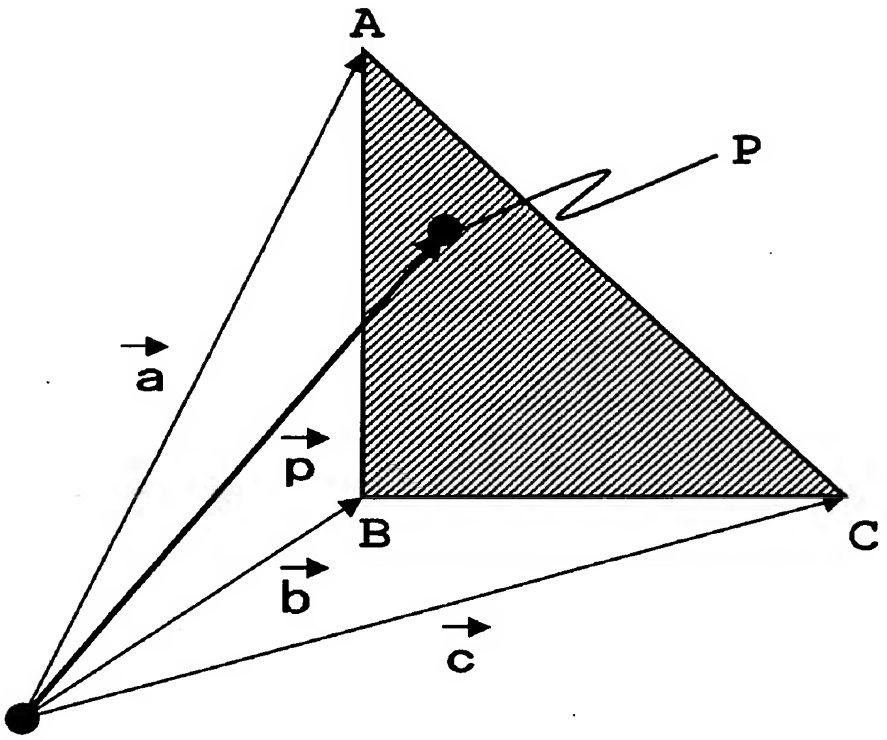


FIG.29

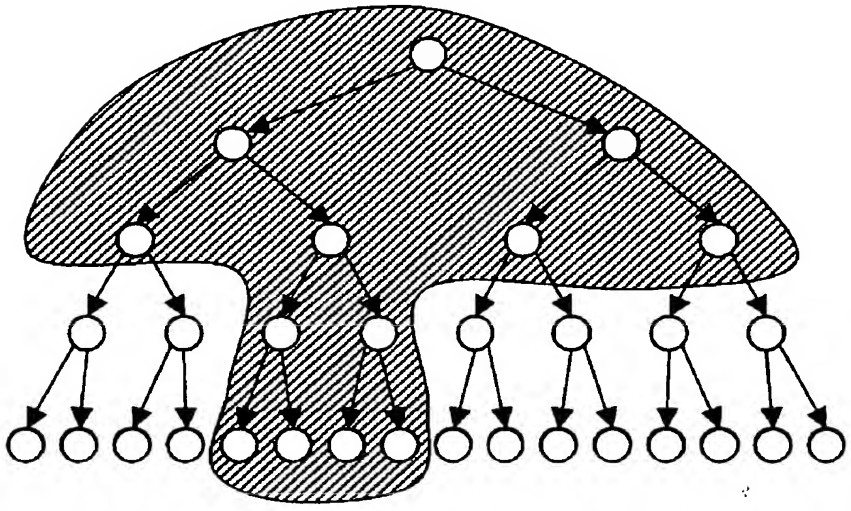


FIG.30

BEST AVAILABLE COPY

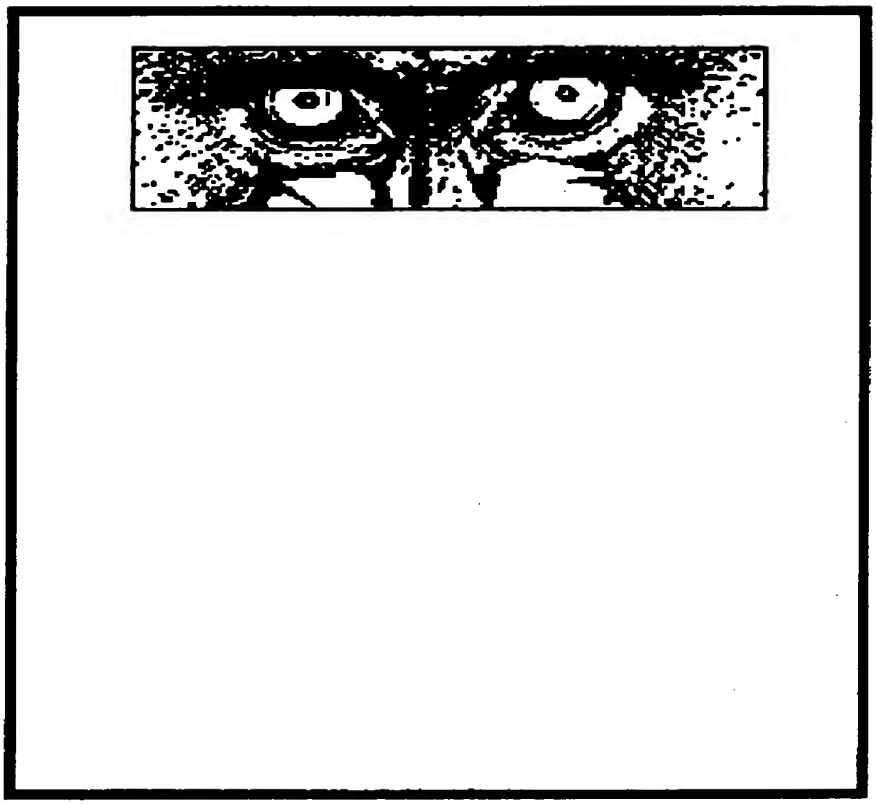


FIG.31

BEST AVAILABLE COPY

FIG.32A

FIG.32B

FIG.32C

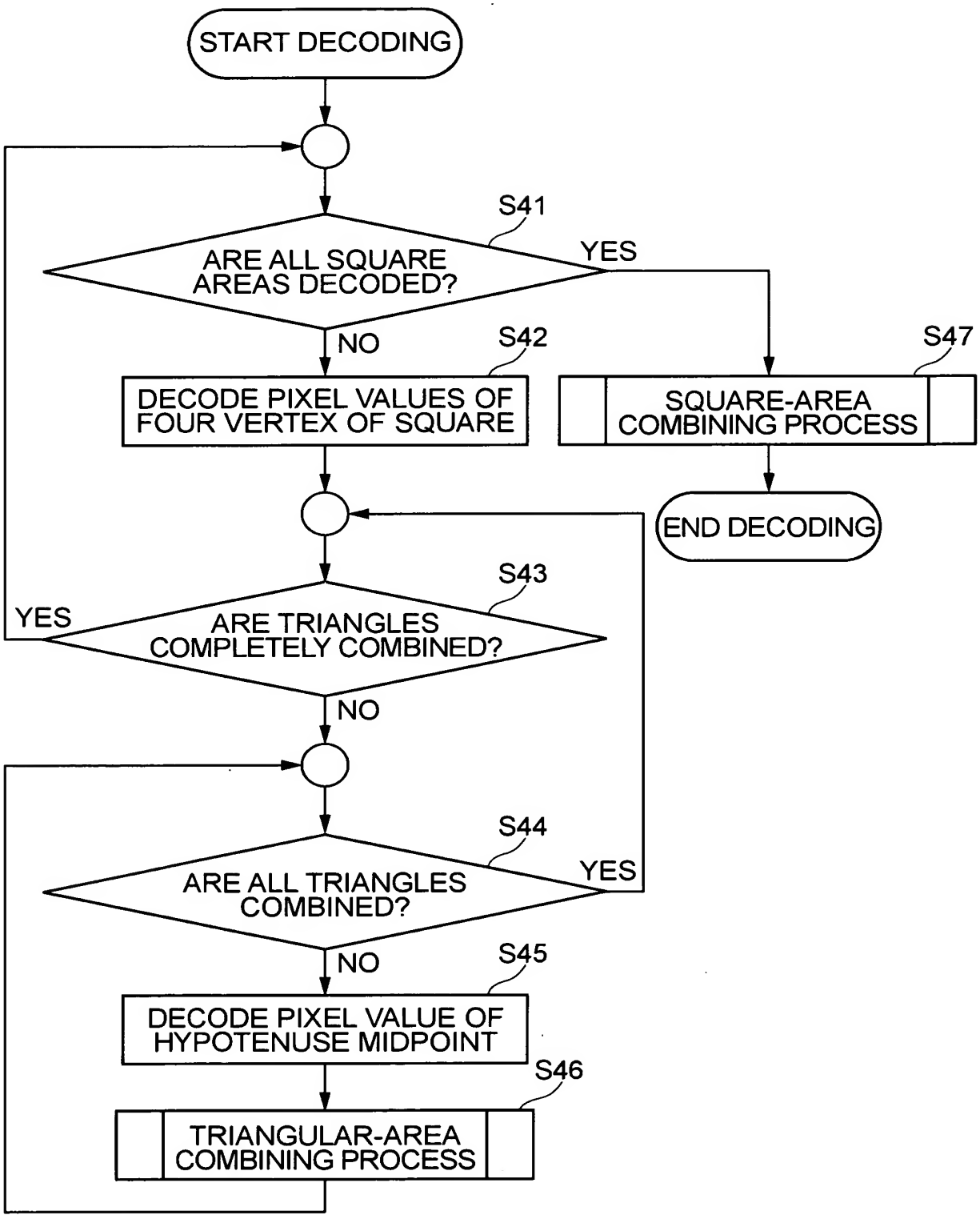

START DECODING
S41
ARE ALL SQUARE AREAS DECODED?
YES
NO
S42
DECODE PIXEL VALUES OF FOUR VERTEX OF SQUARE
S47
SQUARE-AREA COMBINING PROCESS
END DECODING
S43
ARE TRIANGLES COMPLETELY COMBINED?
YES
NO
S44
ARE ALL TRIANGLES COMBINED?
YES
NO
S45
DECODE PIXEL VALUE OF HYPOTENUSE MIDPOINT
S46
TRIANGULAR-AREA COMBINING PROCESS

FIG.33

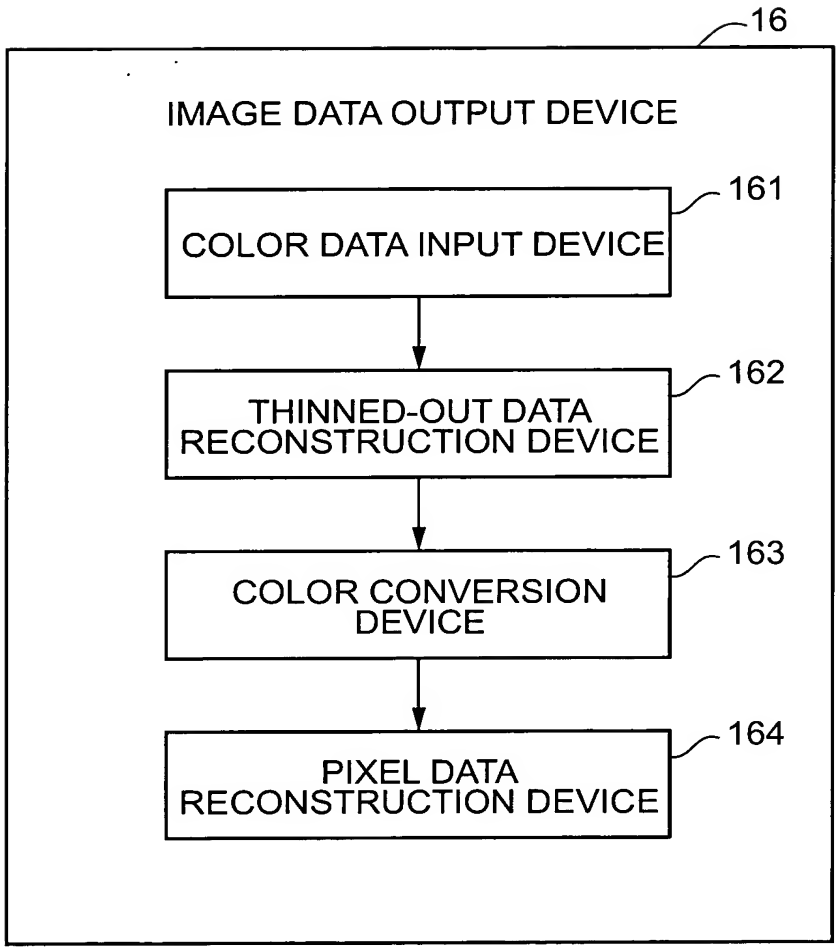

16
IMAGE DATA OUTPUT DEVICE
161
COLOR DATA INPUT DEVICE
162
THINNED-OUT DATA RECONSTRUCTION DEVICE
163
COLOR CONVERSION DEVICE
164
PIXEL DATA RECONSTRUCTION DEVICE

FIG.34

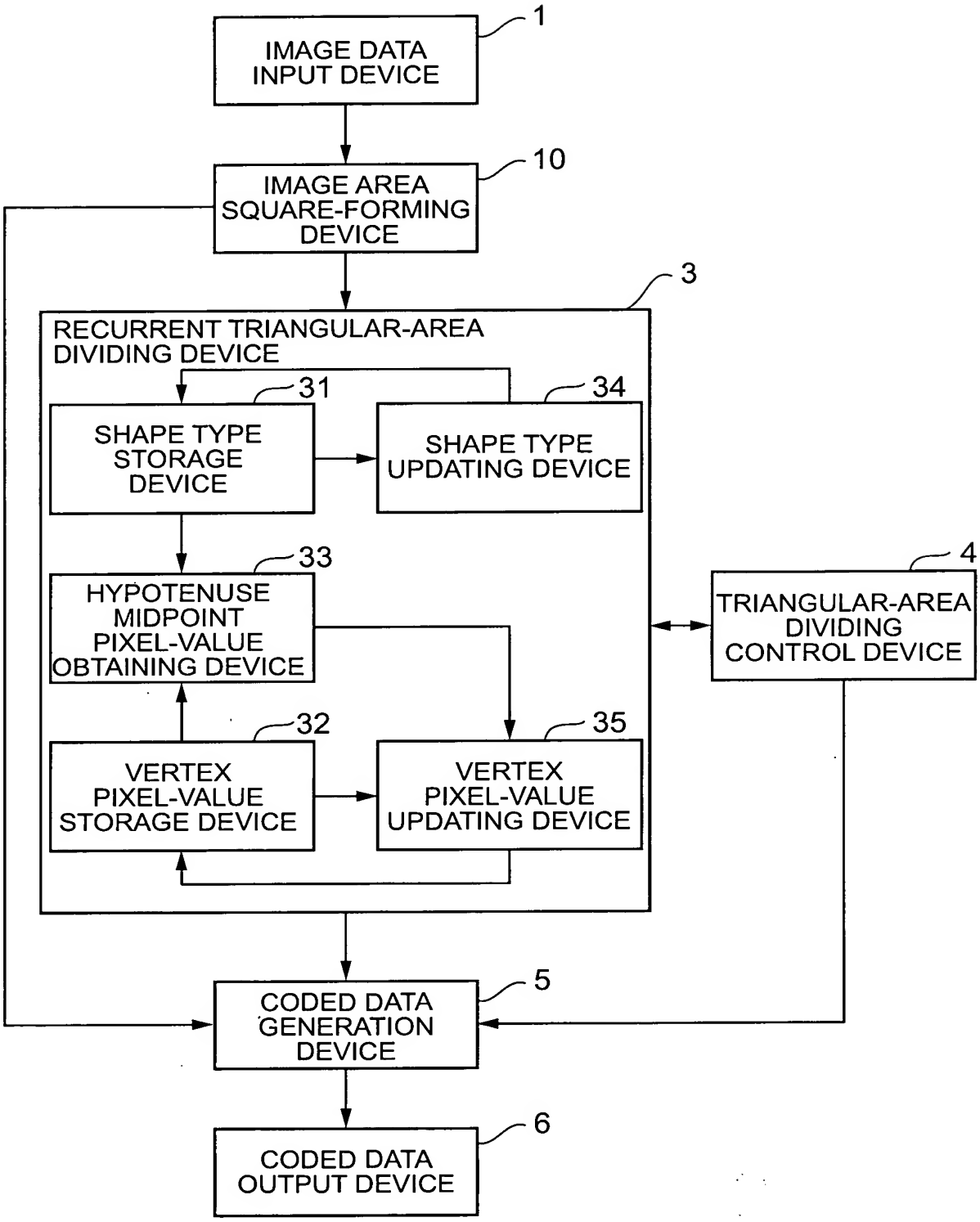

1
IMAGE DATA INPUT DEVICE
10
IMAGE AREA SQUARE-FORMING DEVICE
3
RECURRENT TRIANGULAR-AREA DIVIDING DEVICE
31
SHAPE TYPE STORAGE DEVICE
34
SHAPE TYPE UPDATING DEVICE
33
HYPOTENUSE MIDPOINT PIXEL-VALUE OBTAINING DEVICE
32
VERTEX PIXEL-VALUE STORAGE DEVICE
35
VERTEX PIXEL-VALUE UPDATING DEVICE
4
TRIANGULAR-AREA DIVIDING CONTROL DEVICE
5
CODED DATA GENERATION DEVICE
6
CODED DATA OUTPUT DEVICE

FIG.35

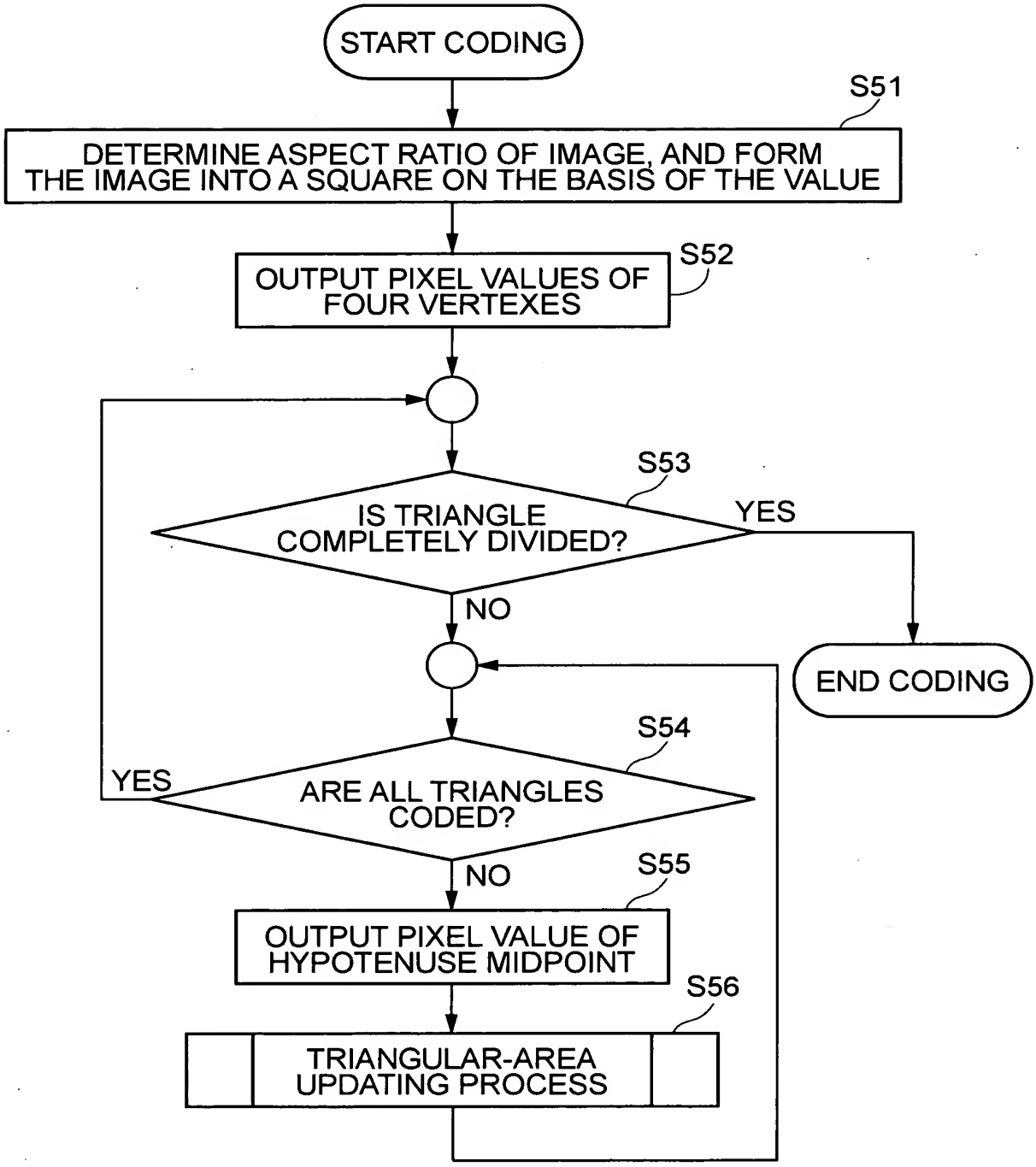

START CODING
S51
DETERMINE ASPECT RATIO OF IMAGE, AND FORM THE IMAGE INTO A SQUARE ON THE BASIS OF THE VALUE
S52
OUTPUT PIXEL VALUES OF FOUR VERTEXES
S53
IS TRIANGLE COMPLETELY DIVIDED?
YES
NO
END CODING
S54
YES
ARE ALL TRIANGLES CODED?
NO
S55
OUTPUT PIXEL VALUE OF HYPOTENUSE MIDPOINT
S56
TRIANGULAR-AREA UPDATING PROCESS

FIG.36

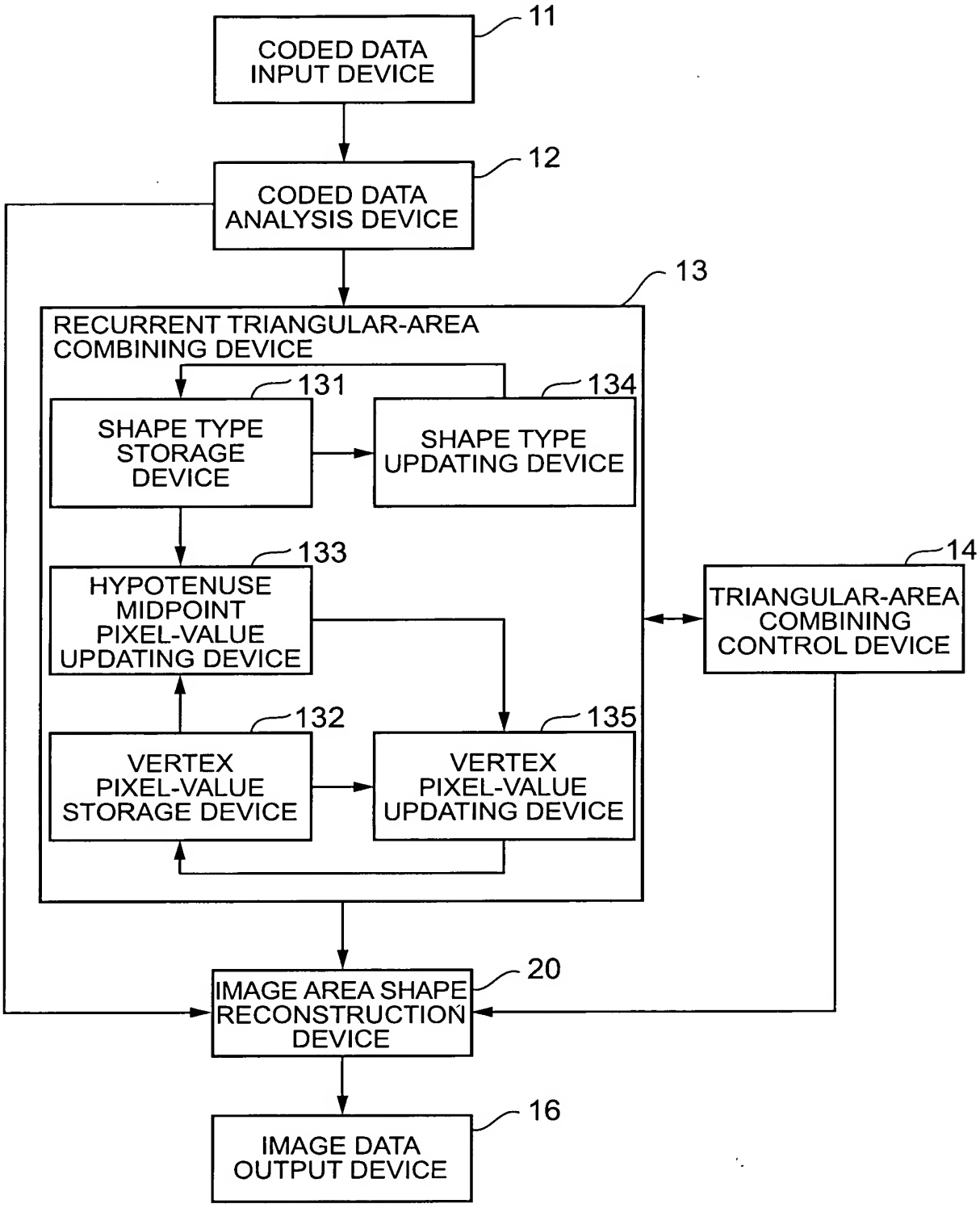

11
CODED DATA INPUT DEVICE
12
CODED DATA ANALYSIS DEVICE
13
RECURRENT TRIANGULAR-AREA COMBINING DEVICE
131
SHAPE TYPE STORAGE DEVICE
134
SHAPE TYPE UPDATING DEVICE
133
HYPOTENUSE MIDPOINT PIXEL-VALUE UPDATING DEVICE
132
VERTEX PIXEL-VALUE STORAGE DEVICE
135
VERTEX PIXEL-VALUE UPDATING DEVICE
14
TRIANGULAR-AREA COMBINING CONTROL DEVICE
20
IMAGE AREA SHAPE RECONSTRUCTION DEVICE
16
IMAGE DATA OUTPUT DEVICE

FIG.37

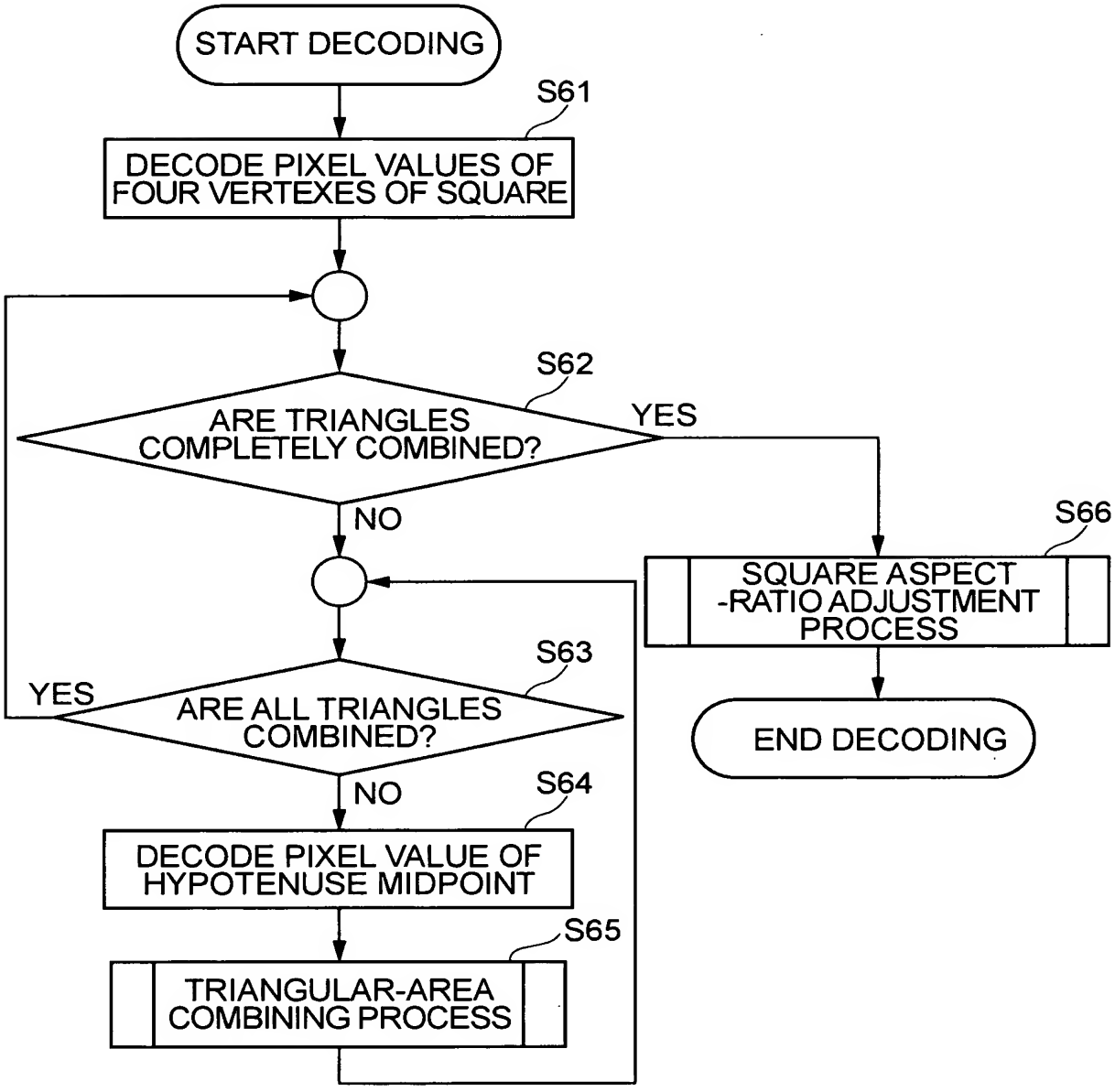

START DECODING
S61
DECODE PIXEL VALUES OF FOUR VERTEXES OF SQUARE
S62
ARE TRIANGLES COMPLETELY COMBINED?
YES
NO
S66
SQUARE ASPECT -RATIO ADJUSTMENT PROCESS
END DECODING
S63
YES
ARE ALL TRIANGLES COMBINED?
NO
S64
DECODE PIXEL VALUE OF HYPOTENUSE MIDPOINT
S65
TRIANGULAR-AREA COMBINING PROCESS

FIG.38